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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/496,212	02/01/2000	Somnath Viswanath	95-333	5880

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MANELLI DENISON & SELTER
2000 M STREET NW SUITE 700
WASHINGTON, DC 20036-3307

EXAMINER	
RYMAN, DANIEL J	

ART UNIT	PAPER NUMBER
2665	

DATE MAILED: 06/09/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/496,212	VISWANATH ET AL.	
	Examiner	Art Unit	
	Daniel J. Ryman	2665	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 April 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3 and 5-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3 and 5-19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-3, 5-8, and 11-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chin (USPN 5,852,607) in view of Bellenger (USPN 5,949,786).

3. Regarding claim 1, Chin discloses a method in a network switch (col. 1, lines 11-15) of searching for a selected switching entry for a received data packet, the method comprising: generating first and second hash keys according to a prescribed hash function in response to first and second information within the received data packet, respectively (col. 3, lines 6-24); combining the first and second hash keys according to a prescribed combination into a signature for the received data packet (col. 3, lines 6-24); and searching a table, configured for storing signatures that index respective switching entries according to the prescribed hash function and the prescribed combination, for the selected switching entry based on a match between the corresponding signature and the signature for the received data packet (col. 3, lines 6-39). Although Chin allows for the invention to be used in a variety of systems (col. 1, lines 11-16), Chin possibly does not disclose that the switching entry is a layer 3 switching entry; however, switching a packet according to layer 3 information is well known in the art, as is evidenced by Bellenger (col. 1, lines 42-59). It would have been obvious to one of ordinary skill in the art at

the time of the invention to have a layer 3 switching entry since layer 3 switching is well known in the art.

4. Regarding claim 2, referring to claim 1, Chin in view of Bellenger discloses that received data packet includes an Internet Protocol (IP) header, the generating step including detecting the first and second layer 3 information from the IP header as the data packet is received by a corresponding network switch port (Chin: col. 1, lines 36-55 and col. 3, lines 6-24 and Bellenger: col. 1, lines 42-59).

5. Regarding claim 3, referring to claim 2, Chin in view of Bellenger suggests that the detecting step includes selecting at least two of an IP source address, an IP destination address, a Transmission Control Protocol (TCP) source port, a TCP destination port, a User Datagram Protocol (UDP) source port, and a UDP destination port as the first and second layer 3 information from the IP header based on elements of each of the layer 3 switching entries used to generate the corresponding layer 3 signature (Chin: col. 3, lines 6-24 and Bellenger: col. 1, lines 42-59) where an IP source address, an IP destination address, a Transmission Control Protocol (TCP) source port, a TCP destination port, a User Datagram Protocol (UDP) source port, and a UDP destination port are "a part A that was previously used to address the table and a part B that is the additional information that is now also required to address multiple look-up tables" (Chin: col. 3, lines 6-24).

6. Regarding claim 5, referring to claim 1, Chin in view of Bellenger discloses verifying whether the selected layer 3 switching entry matches the received data packet (Chin: col. 3, lines 30-39 and Bellenger: col. 1, lines 42-59).

7. Regarding claim 6, referring to claim 5, Chin in view of Bellenger discloses that the verifying step includes: fetching the first layer 3 information from the selected layer 3 switching entry; and determining whether the first layer 3 information from the selected layer 3, switching entry matches the first layer 3 information within the received data packet (Chin: col. 3, lines 30-39 and Bellenger: col. 1, lines 42-59). Chin in view of Bellenger does not disclose comparing both the first and the second information because the second information is used to "select the table" (Chin: col. 3, lines 30-39); however, it is obvious that a comparison of the second information could also be made in order to double check that a correct match has been found. It would have been obvious to one of ordinary skill in the art at the time of the invention to use both the first and the second information in order to double check that a correct match has been made.

8. Regarding claim 7, referring to claim 1, Chin in view of Bellenger discloses detecting a group of the layer 3 switching entries, each having a corresponding layer 3 signature that matches the signature for the received data packet; and verifying one entry from the group of the layer 3 switching entries matches the received data packet (Chin: col. 3, lines 6-24 and Bellenger: col. 1, lines 42-59).

9. Regarding claim 8, referring to claim 7, Chin in view of Bellenger discloses that the verifying step includes: fetching the first layer 3 information for each of the entries of the group of layer 3 switching entries; and identifying the one entry having the corresponding first layer 3 information that matches the first layer 3 information within the received data packet (Chin: col. 3, lines 30-39 and Bellenger: col. 1, lines 42-59). Chin in view of Bellenger does not disclose comparing both the first and the second information because the second information is used to

"select the table" (Chin: col. 3, lines 30-39); however, it is obvious that a comparison of the second information could also be made in order to double check that a correct match has been found. It would have been obvious to one of ordinary skill in the art at the time of the invention to use both the first and the second information in order to double check that a correct match has been made.

10. Regarding claim 11, Chin discloses a method of identifying a switching decision within an integrated network switch having a plurality of network ports and switching logic (col. 1, lines 11-15), the method including: storing, in tables, switching entries that identify data packet types based on the information, respectively, each switching entry identifying a corresponding switching decision to be performed by the integrated network switch (col. 3, lines 6-24); generating an entry signature for each of the switching entries based on a prescribed hash operation performed on first and second portions of the corresponding information (col. 3, lines 6-24); generating a packet signature by a network port for a data packet at the network port based on performing the prescribed hash operation on the first and second portions of the information in the corresponding received data packet (col. 3, lines 6-24); and identifying by a network port one of the switching entries for switching of the received data packet based on detecting a match between the packet signature and the corresponding entry signature (col. 1, lines 36-55 and col. 3, lines 31-39). Chin's system is expressly implemented using multiple tables rather than a single table (col. 1, lines 11-15); however, it is obvious that a single table can be formed from multiple tables with the multiple tables forming a section of the single table and vice versa. It would have been obvious to one of ordinary skill in the art at the time of the invention that the multiple tables could be combined into a single table or that the single table could be broken into multiple tables

where the breaking and combining of tables could be done depending on the type of memory (central or distributed) and the memory size of the switching device. Although Chin allows for the invention to be used in a variety of systems (col. 1, lines 11-16), Chin possibly does not expressly disclose that the switching entry is a layer 3 switching entry. Switching a packet according to layer 3 information is well known in the art, as is evidenced by Bellenger (col. 1, lines 42-59). It would have been obvious to one of ordinary skill in the art at the time of the invention to have a layer 3 switching entry since layer 3 switching is well known in the art.

11. Regarding claim 12, referring to claim 11, Chin in view of Bellenger suggests that the step of generating an entry signature includes: selecting at least two of an IP source address, an IP destination address, a Transmission Control Protocol (TCP) source port, a TCP destination port, a User Datagram. Protocol (UDP) source port, and a UDP destination port as the first and second portions of the corresponding layer 3 information; generating first and second hash keys for the first and second portions of the corresponding layer 3 information in the layer 3 switching entry based on the prescribed hash operation; and combining the first and second hash keys to form the entry signature (Chin: col. 3, lines 6-24 and Bellenger: col. 1, lines 42-59) where an IP source address, an IP destination address, a Transmission Control Protocol (TCP) source port, a TCP destination port, a User Datagram Protocol (UDP) source port, and a UDP destination port are "a part A that was previously used to address the table and a part B that is the additional information that is now also required to address multiple look-up tables" (Chin: col. 3, lines 6-24).

12. Regarding claim 13, referring to claim 12, Chin in view of Bellenger suggests that the step of generating a packet signature includes: selecting the at least two of an IP source address,

an IP destination address, a Transmission Control Protocol (TCP) source port, a TCP destination port, a User Datagram Protocol (LTDP) source port, and a UDP destination port as the first and second portions of the corresponding layer 3 information in the received data packet; generating third and fourth hash keys for the first and second portions of the corresponding layer 3 information in the received data packet based on the prescribed hash operation; and combining the third and fourth keys to form the packet signature (Chin: col. 3, lines 6-24 and Bellenger: col. 1, lines 42-59) where an IP source address, an IP destination address, a Transmission Control Protocol (TCP) source port, a TCP destination port, a User Datagram Protocol (UDP) source port, and a UDP destination port are "a part A that was previously used to address the table and a part B that is the additional information that is now also required to address multiple look-up tables" (Chin: col. 3, lines 6-24).

13. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chin (USPN 5,852,607) in view of Bellenger (USPN 5,949,786) in further view of Schnell (USPN 5,757,795).

14. Regarding claim 9, referring to claim 7, Chin in view of Bellenger possibly does not expressly disclose that the network switch is an integrated circuit chip, the searching step including searching a signature table located on the integrated circuit chip, and the fetching step including accessing the first and second layer 3 information from a policy table in a memory external to the integrated circuit chip. Schnell discloses, in a network switch, that functional logic and memory blocks can be grouped as "several chips, a single, integrated chip, or an application specific integrated circuit (ASIC), etc." (col. 8, lines 44-50). Thus it would have been obvious to one of ordinary skill in the art at the time of the invention to have the network switch be an integrated circuit chip; the searching step include searching a table located on the

integrated circuit chip; and the fetching step include accessing 3 information from a policy table in a memory external to the integrated circuit chip since functional logic and memory blocks can be grouped as any combination of chips.

15. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chin (USPN 5,852,607) in view of Bellenger (USPN 5,949,786) as applied to claim 1 above, and further in view of Wilford (USPN 6,157,641) in further view of Wilford (USPN 6,212,183).

16. Regarding claim 10, referring to claim 1, Chin in view of Bellenger possibly does not expressly state forwarding an identifier specifying the selected layer 3 switching entry from a network switch port, having received the received data packet, to layer 3 switching logic within the network switch. Wilford ('641) and Wilford ('183) disclose generating a hash key and transmitting that hash key to an external memory where routing information is stored (Wilford '641: col. 6, lines 5-16 and Wilford '183: col. 5, lines 24-36). As broadly defined, a memory where routing information is stored is "switching logic" since the routing information dictates where the packets should be switched. While not expressly disclose why this transfer occurs, it is obvious that one benefit of this system is that the hash key only needs to be generated once and then it can be transmitted to any number of other devices or components. It would have been obvious to one of ordinary skill in the art at the time of the invention to transfer the hash key to the switching logic in order to allow the system to generate the hash key only once.

17. Claims 14-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chin (USPN 5,852,607) in view of Bellenger (USPN 5,949,786) in further view of Manning (USPN 6,473,400).

18. Regarding claim 14, referring to claim 11, Chin in view of Bellenger discloses that the step of identifying one of the layer 3 switching entries includes: searching a signature table within the integrated network switch for one of the entry signatures matching the packet signature (Chin: col. 3, lines 31-39). Chin in view of Bellenger possibly does not expressly disclose retrieving from the signature table an address location of the one layer 3 switching entry corresponding to the matched entry signature; and accessing the one layer 3 switching entry from an external memory based on the retrieved address location. Manning discloses that "In order to save memory space, the tables may store hashed addresses rather than full addresses, the hashed address data pointing to the full address in a separate memory in known manner" (col. 6, lines 41-45) where it is obvious that the separate memory could be an external memory and where it is obvious that the full address space would include any subsequent information, such as the switching entries. It would have been obvious to one of ordinary skill in the art at the time of the invention to retrieve from the signature table an address location of the one layer 3 switching entry corresponding to the matched entry signature; and accessing the one layer 3 switching entry from an external memory based on the retrieved address location in order to save memory space.

19. Regarding claim 15, referring to claim 14, Chin in view of Bellenger in further view of Manning discloses that the step of identifying the one layer 3 switching entry includes verifying that the one layer 3 switching entry matches the received data packet (Chin: col. 3, lines 31-39).

20. Regarding claim 16, Chin discloses an integrated network switch configured for executing switching decisions (col. 1, lines 11-15), comprising: index tables including for each address entry a corresponding entry signature representing a combination of selected first and

second portions of the corresponding layer 3 information hashed according to a prescribed hashing operation (col. 3, lines 6-24); a plurality of network switch ports, each comprising: (1) a frame identifier configured for obtaining the first and second portions of layer 3 information within a data packet being received by the network switch port (col. 1, lines 37-55 and col. 3, lines 6-24), and (2) a flow module configured for generating a packet signature by generating first and second hash keys for the first and second portions from the data packet based on a prescribed hash operation, the flow module identifying one of the switching entries for execution of the corresponding switching decision for the data packet based on a determined correlation between the packet signature and the corresponding entry signature (col. 1, lines 37-55 and col. 3, lines 6-24); and switching logic for executing the switching decision for the data packet based on the corresponding identified one switching entry (col. 1, lines 37-55 and col. 3, lines 6-24). Chin's system is expressly implemented using multiple tables rather than a single table (col. 1, lines 11-15); however, it is obvious that a single table can be formed from multiple tables with the multiple tables forming a section of the single table and vice versa. It would have been obvious to one of ordinary skill in the art at the time of the invention that the multiple tables could be combined into a single table or that the single table could be broken into multiple tables where the breaking and combining of tables could be done depending on the memory size of the switching device. Although Chin allows for the invention to be used in a variety of systems (col. 1, lines 11-16), Chin possibly does not expressly disclose that the switching entry is a layer 3 switching entry. Switching a packet according to layer 3 information is well known in the art, as is evidenced by Bellenger (col. 1, lines 42-59). It would have been obvious to one of ordinary skill in the art at the time of the invention to have a layer 3 switching entry since layer 3

switching is well known in the art. Chin in view of Bellenger possibly does not expressly disclose index tables that includes addresses of switching entries that identify respective data packet types based on the information. Manning discloses that "In order to save memory space, the tables may store hashed addresses rather than full addresses, the hashed address data pointing to the full address in a separate memory in known manner" (col. 6, lines 41-45) where it is obvious that the full address space would include any subsequent information such as the switching entries. It would have been obvious to one of ordinary skill in the art at the time of the invention to have index tables that includes addresses of switching entries that identify respective data packet types based on the information in order to save memory space.

21. Regarding claim 17, referring to claim 16, Chin in view of Bellenger in further view of Manning discloses that the flow module, in response to determining the correlation between the packet signature and the entry signature, fetches selected portions of the layer 3 information from the one layer 3 switching entry for verification that the one layer 3 switching entry matches the data packet (Chin: col. 3, lines 31-39 and Bellenger: col. 1, lines 42-59).

22. Regarding claim 18, referring to claim 16, Chin in view of Bellenger in further view of Manning discloses that the frame identifier selects at least two of an IP source address, and IP destination address, a Transmission Control Protocol (TCP) source port, a TCP destination port, a User Datagram Protocol (LTDP) source port, and a UDP destination port as the first and second portions of layer 3 information within the data packet (Chin: col. 3, lines 6-24 and Bellenger: col. 1, lines 42-59) where an IP source address, an IP destination address, a Transmission Control Protocol (TCP) source port, a TCP destination port, a User Datagram Protocol (UDP) source port, and a UDP destination port are "a part A that was previously used to

address the table and a part B that is the additional information that is now also required to address multiple look-up tables" (Chin: col. 3, lines 6-24).

23. Regarding claim 19, referring to claim 16, Chin in view of Bellenger in further view of Manning suggests an external memory interface configured for providing access by the flow module to the one layer 3 switching entry, stored in a memory external to the integrated network switch, based on the corresponding address entry (col. 6, lines 41-45) where it is obvious that the separate memory could be an external memory.

Response to Amendment

24. Applicant's arguments with respect to claims 1-3 and 5-19 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel J. Ryman whose telephone number is (703)305-6970. The examiner can normally be reached on Mon.-Fri. 7:00-5:00 with every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Huy Vu can be reached on (703)308-6602. The fax phone numbers for the organization where this application or proceeding is assigned are (703)308-6743 for regular communications and (703)308-9051 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)305-3900.

Daniel J. Ryman
Examiner
Art Unit 2665

DJR

Daniel J. Ryman
May 22, 2003

HUY D. VU
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600